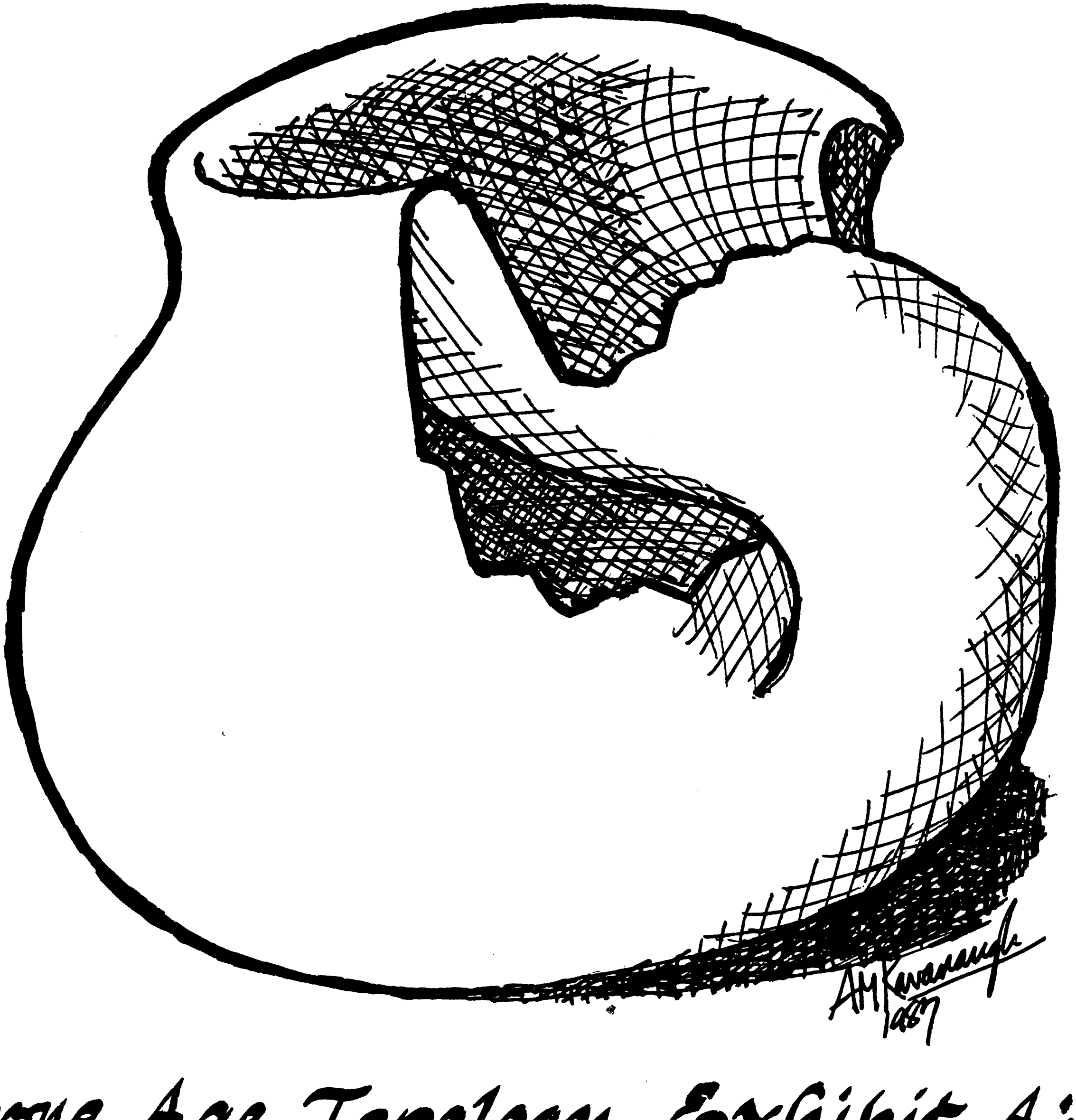
ApaTech



Stone Age Topology, Exhibit A:
The Klein Pot

March 1988

Apa-Tech 58

The 555 Times

The Amateur Press Association of General Technics

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The deadline for Apa-Tech 59 is Sunday, May 1st in San Diego.

Dropped (lack of activity and/or money): Jamie Hanrahan, John Hall, Lee Hart, Roxanne Meida, Steve Salaba, Scott Shields, Kiran Wagle

Your account **before** postage is $ -4.58 (? - unless you gave me money recently)

Notes from the Chair

I haven't talked to Shalmaneser about this yet, but I'm about ready to throw in the towel. It seems that I've had to dig deeper inside myself each month to find the desire to expend my energies on what looks to be a dead horse. I've enjoyed being a part of this apa, but the effort no longer seems worth the reward. With only 3 people contributing this month after the pleas Greg and I have both made to let us hear more from more of you, and with 7 people being dropped due to lack of activity and/or money, I'm ready to admit defeat. I'm also ready to try to build up my enthusiasim again, if that's what you really want, but let's be honest. Please don't tell us you want to keep going if you have no realistic intention of taking an active part. As I said, I haven't talked to Greg about this yet (other then in a general way in the past 6 months), so I'm not sure what his feelings are but think it through, and let us know yours.

GTB

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TRANSPORTER
TOPICS

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Number 52

I am a bit distressed to hear that we are back to a two-month schedule. Oh well; I have been so busy lately that maybe it is for the best, at least for me.

* * *

I have recently bought three new programs for my Amiga; Test Drive, BattleMech and Ogre. Test Drive is incredible. It is an arcade style game, normally played through the joystick. You get to choose between five high performance cars. My favorite is the Lamborghini Countach, not surprisingly. The stereo sound effects were developed from actual samples. Engine sounds, road noise and tire screeches are all impressive, as are such touches as the occasional bug going *splat* against the windshield. I just love sitting in front of a V-12.

BattleMech is a computerized version of the miniatures game, featuring battles between giant robots. You can pick from an assortment of existing mechs or roll your own. Lots of fun, though some of the sound effects are a bit punk. The mapping subroutine is especially impressive.

Ogre is a computer version of the Microgame from the seventies. Just you and an assortment troops and standard sized armored vehicles (tanks, self-propelled guns, hovercraft, missile launching tanks) against something that would give a Bolo pause.

I have also heard a friend rave about "Chuck Yeager's Flight Test" and plan to get it as soon as the game comes out for the Amiga.

* * *

In late January I had the good luck to participate in two martial arts clinics. Unfortunately, they were only three days apart. On Saturday morning, our club had as its guest Dr. Rod Sacharnoski, one of the top martial artists in the world. He gave a throwing clinic in our dojo. In addition to our instructor and three black belts from our school (I was one of them) we had our instructor's first teacher and some of his students. I was paired with my instructor's instructor, a very large man, and nearly every time I threw him I noticed that Dr. Sacharnoski looked over our way, seeming to be impressed. I don't think it was my skill; more likely he was recognizing that I was cleanly lifting a man nearly twice my weight. Not easy, but possible if you do the throw right. Then, in a session on how to handle someone you are arresting (Dr. Sacharnoski gives clinics to law enforcement agencies all over the country) our guest nearly dislocated my shoulder. Unfortunately, while the man is an expert in his field, he is of the "we're tough and you're not" school. Our classroom has throwing mats. He talked about how students in his school just threw on the floor. A concrete floor. Well, he did admit that it had linoleum tiles.

The following Monday evening Bill Wallace was in Frankfort to give our class a special clinic. Wallace is a fun guy, and good with kids. You wouldn't believe it to look at him; that face is the reason that he keeps getting bad guy roles in movies. He picked me as his partner for the demonstrations, a humbling experience. Other people took pictures of me during the stretching exercises and I am amazed at how low I got. I didn't notice at the time; I was too busy worrying about how I was going to get back up. I was sore the next morning, but not in my legs. I was aching all through my neck and shoulders, because I was just coming down with the flu!

* * *

Rubicon, held in Lexington, KY, every January, was a lot of fun this year. The only down side was that the jacuzzi was busted. The hotel, the Mariott Griffin Gate, has a jacuzzi large enough to swim in, and I was really looking forward to lazing in it (as opposed to lasing in it). I brought my new VCR (more on that later) and showed a lot of movies, many of the Japanimation. I also got to try the Star Wars roll playing game, creating an old barnstormer of a pilot. It was fun.

* * *

The day after Christmas I went shopping for a new VCR. I bought my first one eight years ago and it is starting to deteriorate, though it has given good service. After investigating several models in three stores, I settled on a Mitsubishi HS-359UR. It cost a bit more than I had wanted to spend, but it played the sample tape I brought with me better than any of the others I had tried. In fact, it played this tape, recorded by my old machine, better than my old machine did! Unfortunately, it was a display model and they couldn't find the box or manual. I will have to order one of the latter later, but for now am able to make it perform most of its functions.

Mailing Comments

Uncle Bear: I received this early enough to comment on it in the last APA-Tech, but couldn't find it when the time came to write. Sorry. * My favorite forgotten gadget is the Rovac air conditioner, which used air as the working medium. Any one else remember it? * One of the concepts for the B2 Stealth Bomber is something called the Spanloader. It is actually a flying wing, but since the military rejected the concept back in the fifties the contractor won't call it that. * Someone told me the other day that the Russians had succeeded in having a breakeven fusion reaction. No word from other sources. *

Crumbcrunchers: Frankfort had its 200th anniversary last year. So there. (-: Frankfort, however, has changed more this century than your town. * No further info about Khanfar/Lexikhan, or whatever they're calling it this week. *

Bonnie: Many of the mapmaking steps you describe I have seen taking place in my building. In addition to the older pen and ink method, we recently got two Intergraph machines. They are bulky, slow and difficult to use. I tried to convince my boss that an Amiga with a photodigitizing setup could do a better job for a fraction of the price, but had no luck. *

Rolf: An easy way to rid cats of fleas is to use dried pennyroyal herb. A little under the couch cushions and maybe some in a cloth collar for each cat will keep the fleas away. The herb is inexpensive and smells nice, to boot! However, don't use pennyroyal oil; it's an irritant and slightly toxic. * I exercise in my living room to "All Things Considered" in the afternoons. Keeps me informed and free from boredom. *

Higgins: Re. Yr. Cmnt. Me: Story ideas I got. Finished product is what I need. * A local TV station will provide seed money, films and promotion for the convention to help draw attention to the new Star Trek show. * _Magnus_ had a very interesting premise and a well thought out future society. Most people in this society simply don't care about who runs things or how, which gives unscrupulous people and robots the chance to gain control of small or large segments of the planet. Yes, there are robots as characters. Most robots are non-sentient, but sentient machines have been around for centuries. One of the oldest is Magnus' mentor, who calls itself 1A. The technology is well portrayed. There are floating cushions and chairs, anti-grav elevators and aircraft which are piloted from the prone position. The civilization has FTL flight and extra-solar colonies. The world in these stories gives a sense of history, more than, say, Star Trek does. *

The Helous: First things first: how do you pronounce your last name? (Listen, a guy named Smith has trouble with these things.) * I have an interest in Psychology and have a friend who has a doctorate in Educational Psych. Does that count? For a topic, how about the influence of instinctive behavior on the ways in which people relate to each other? Does dominance affect people's relationships in the workplace? Is some obsessive-compulsive behavior simply a misplaced grooming instinct? Is homosexuality a derivation of the dominance-related mounting displays often seen in primates? That sort of thing. *

Greg: One way to cut down on expense and travel time in a crewed mission to Mars is to send most of the supplies ahead in unmaned vehicles, to wait in orbit for the people. These could take a slower, cheaper route and be launched over a period of years. *

Valli: Buy lined paper and print on that until you get your typewriter fixed. It helps keep things even. * I mean that we will be able to artificially induce the biochemical changes which occur when someone falls into romantic love. What a person falls in love with is their business. * I was in Europe about four years ago, as a result of winning a contest. I got a free ten day trip for two from Time Life, plus spending money. It was my choice of where, limited to places serviced by a regular airline. We went to England, and from there visited Wales, Scotland and France. The trip is detailed in a back issue of APA-Tech. *

* * *

My long bout with digestive tract problems seems to be fading. Three years is a long time to put up with this sort of thing.

* * *

I had all three of my cats vaccinated in one morning, shortly before leaving for Rubicon. I was expecting protest on their part and donned armor in preparation. A heavy nylon jacket and leather gloves were used for protection and the cats carefully and firmly gripped. Turned out that none of this was needed, except for the firm hold. All three cats gave only token resistance, including Pepper, my wildest one. They were examined, injected and wormed for an even $100. I really like the mobile vet concept. It is much easier on you and the animal to have him come to your house.

* * *

I am up to chapter 13 on my novel and have recently taken the step of outlining the remaining chapters. You may think it strange that I am only now working on an outline, but it really isn't. The book was started on a whim, while I was learning how to use the first word processor we got at work. It was never planned out in detail but just sort of grew as I went along. This is not a bad way to write, especially if you are good at making up stories as you go along. My years of refereeing roll playing games has been a big help, since a good referee has to be able to change the play of the game when the players take an unexpected route.

* * *

Speaking of games, I have been having fun in a Golden Age of Champions campaign lately. It is set in 1940 and follows the general premise of the Wildcard books. My first character was a woman named Mist, but she wasn't good enough in the offensive category for the game. I am now playing my version of the original super hero. That is, Popeye, the sailor. Those of you whose experience of Popeye is limited to the various cartoons are missing a great character. When I call him the original super hero, I mean it. In a strip from 1931, a companion calls him a "super man." Well, Segar used two words, but he still used the term first (in the comic related field, that is).

See ya' later!

Rod

(Parenthetical Perambulations)

Some extremely low-tech samizdat
from

Annette Kavanaugh
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Minneapolis MN 55414

Contents:

1. A Word from Our Sponsor
   (news, gossip, unsubstantiated rumor)

Please to excuse chicken scratching!

A Word from our Sponsor ...

"GRAD SCHOOL IS HELL."

Yes, ladies, gentlemen, & aliens, I am STEALING the time to write this zine, and ONLY because the ApaTech deadline is an IMMUTABLE CONSTANT OF THE UNIVERSE, which I am EVER loath to violate. My real analysis problem sets will be there tomorrow, but the 1st of March, once past, will never come again. There we have it, friends & colleagues, the secret of my academic & social success — a finely honed sense of Priorities.

To those who are considering the move from civilian life to graduate school: Reconsider. You will be, as I, a penniless apprentice in the most medieval of the professions, a grunt in the trenches of academia, a chronic victim of sleep-deprivation psychosis. (After 36 hours, one gets jumpy & paranoid and wary of the baleful things the furniture is saying about one behind one's back. I speak with the authority of experience — RECENT experience.)

NEWS: We *will* be at Minicon, the fates willing. (I have deprived myself enough this year — I *will* have some fun!) Hope to see everybody there (hint, hint, hint.)

Re: the new Apatech schedule. Excellent idea! The incubation time for a critical mass of guilt seems to be about a month and a half, so I may actually contribute more often than I did on the old schedule.

MAILING COMMENTS:

Donna & Tullio (and Marty & Alex & Renee): Thanks for your hospitality — I'm sorry I was sick & missed most of the fun. The fireworks were nifty, as was the movie showing. (Now I know where the Official GT Anthem comes from!) Things seemed to be as well-organized as possible — my folks had considerably more difficulty getting us kids to come in for KP.

Crumbcrunchers Re intensive seminars vs. quarter-long courses: But that's the way I *always* learn stuff (ie in a big clump all at once, generally at the *end* of the quarter)! I think they pad the term with all ~~that~~ extra time so that (A) the students will have time to relax and (B) they can charge exorbitant rates for it and feel justified.

I agree with you about the new *Star Trek*. I have wasted many a delightful hour enumerating its defects with other closet Trekkies. (I have an absurd fondness for the original show, doubtless because it is a relic of my youth.) I am still groaning over the alleged supernova that coughed up one huge styrofoam boulder, handily aimed right at the *Enterprise*. They ought to get the science accurate enough to satisfy the educated ignorami, such as your Humble Author. And the security chief ought not to be so young or so hotheaded – they no doubt think themselves quite gutsy for casting the role as female, but they ought to have gone the distance and made her forty or forty-five years old, and sufficiently levelheaded to be trusted with the handling of major crises.

Transporter Topics Great piece on target shooting. I haven't done it in a while but agree with you that it is most satisfying. Maybe when I get Out of Here, five years hence, I will buy myself an appropriate gun & Take some marksmanship courses. Ed grew up in a household headed by a gun collector, and learned the rules of firearm safety around the time that I learned to tie my shoes (c. 5 years of age). My dad never let us play with realistic-looking toy guns, on the assumption that it taught bad habits (such as pointing projectile weapons at people toward whom one had no lethal intent.) I must admit some shock at the stories of the plastic pellet guns at Ishercon last year; that sort of thing was on the verboten list when I was a kid, for the safety reasons Bonnie cited.

Re: spent cartridges hitting one in the face. This has never happened to me, but they do seem to ~~they~~ land in my pocket (shirt) a lot; therefore I make certain to wear a reasonably heavy shirt when I go shooting.

Re: progress on novel. Rah rah rah sis boom bah. As former aspiring literateur, I desire details (if you don't think they'll bore the rest of the populace.)

Bonnie (My Kind of Town) Congrats on the new job, & hope you are enjoying the new apartment. Interesting piece on printing —

chemistry); apparently the scientists were willing to try the experiment (and willing, some of them at least, to admit talented females as colleagues — Kovalevskaya was admired by many of the foremost of her mathematical colleagues.) I am also searching for a good biography of Emmy Noether, one of the founders of modern algebra. (I admit it: whenever her name turns up in my algebra book I feel a glow of pride. Nothing like being a credit to one's race. Apparently she was run out of Germany in the thirties along with lots of other talented folk — as a female Jewish professor with liberal sympathies, her presenc was not to be tolerated.)

Also, get a copy of *How to Suppress Women's Writing*, by Joanna Russ. (University of Texas Press). I disagree only with Russ' choice of title: the operative verb ought to be 'Dismiss'. This little book ought to be a supplement not only to courses in literature but in rhetoric, as it is a bestiary of bad reasoning ~~that transcends~~ the classical fallacies of logic.

Liked your franking tremendously.

I sense a stirring in the Force, as if
Barry Gehm had graduated and
moved to Chicago…
…or maybe it was just some planet
blowing up.

Yes, I finally did it. Messages of congratulation or expressions of disbelief can be sent to me at the addresses below. Visitors are also welcome!

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A STIRRING IN THE FORCE

Three weeks ago last Friday I passed my doctoral oral examination. The following Monday I moved to Chicago, and the next day started work at my new job at U. of C. Many to the folks who helped with the move; as you can see I was under some time constraints. I still have so many un-unpacked boxes I can barely walk around my apartment. This contribution will once again have to be brief. A few impressions of U. of C.:

These are the big leagues. On the way to work I walk past the spot where Enrico Fermi built the first atomic pile. The squash courts are gone, but there is a plaque and a Henry Moore sculpture marking the spot. More to the point, the laboratory next to the one I work in is run by a Nobel laureate. Somebody remarked to me that you can't spit out the window at U of C without hitting a Nobel laureate, which is a slight exaggeration, but they do have quite a few, and are well aware of it. At the bookstore you can buy a t-shirt that has the names of all the Nobel prize-winners currently or formerly associated with the university. There have been fifty-five.

I hope this will make up for having to extend my vow of poverty for a couple more years. Supposedly I'm making 50% more a year as a post-doc than as a graduate student, but as a grad student I didn't pay Social Security. With that plus the higher income tax deductions, I'm making $50 a month more than I was in Lansing, and paying $80 a month more in rent. I felt like I'd got kicked in the stomach when I saw my first check. Valli, can you tell me lots of fun cheap things to do in Chicago?

No time to write mailing comments (or to look for the last disty in all these boxes.) See you in 60. Barry

IN LIKE AN ION, OUT LIKE AN AMP

for APA-TECH 58
March 1988

Gregory Ruffa
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(619)-695-8647

* * *

Now that things have quieted down and our visitors have left (and it's such an ugly day outside), I can take a moment to write to you. There's not much to say about myself at the moment, so I'll tell you about what's doing at work.

As I've mentioned before, I am mission engineer in the Flight Mechanics department for the Eutelsat-II launch, which officially lifts-off in the "first quarter of 1990" (actually, there is a contractual date set, but Eutelsat doesn't want Aerospatiale, their satellite manufacturer (and a prime contractor for Ariane), to know it. Besides, some of us don't believe the date, either). We had our "Critical Design Review" for the new Atlas/Centaur-I vehicle at the beginning of April, to which our signed customers were invited. The CDR formally defines the engineering details of the rocket; things will still change during the stages up to fabrication, but we know pretty much know what will be built into this model. It looks like we'll be able to lift pretty much (to within about 0.5%) what we said we could, which is good to hear at this point; the customers were all still happy. We are committed to building eighteen of the Atlas/Centaur-I; depending on how you do the counting, we (possibly) have sold all of these already. I have heard that upper management is contemplating extending the production run to 32.

The turmoil now is over the Atlas/Centaur-II and its derivatives. This vehicle has been proposed to serve as the so-called "MLV-II" for Navstar and perhaps other Defense missions. I spoke last summer about our failure to win the "MLV" contract. The Delta-II is being developed to take the first series of GPS (or Navstar) satellites to orbit. The detail McDonnell Douglas overlooked is that they do not have enough performance to lift the later, heavier GPS spacecraft **and** steer the Delta's path clear of certain populated areas, which is a critical safety concern. When the Air Force realized this, they had to re-open bidding to launch the rest of the satellites. We're supposed to get a decision next month, though it could be later (it has already been postponed once). This would account for some ten or twelve MLV-II launches, which would make it worth our while to develop the Atlas/Centaur-II and variants; some of these would also be offered to customers with heavier spacecraft, such as Aussat-II and Intelsat-VII (discussions are already underway).

While the Eutelsat representatives were here, they were joined by a group from Aerospatiale for a "technical interchange meeting" with us. This was a two-day meeting largely intended for the engineers to meet face-to-face to determine what issues are settled and what questions need to be answered. I sat as chairman for the Mission Design and Analysis Working Group; this sounds rather more grand than it is. My co-workers from Flight Mechanics and I spent a bit over a day discussing how well Atlas/Centaur-I would be able to perform the Eutelsat mission and figuring out what the Europeans would yet need to tell us and by what dates. The issue is a bit complicated for them because the satellite design and the mission design are strongly linked; thus, they are reluctant to commit to a final decision this soon. It seems likely that we will pursue a plan by which Eutelsat gets to geostationary orbit by actually being thrown beyond it by Centaur. Without delving into the theory in detail, the reason for sending Eutelsat to a "supersynchronous" altitude is that it becomes cheaper for their spacecraft's propulsion to bring the satellite down to an equatorial orbit as they go to progressively greater remove from the Earth. The optimal result would be to toss them about a quarter of the way to the Moon, but certain aspects of the satellite's sensor and control systems militate against this; we are still working with these folks to see how far out they'll decide to go.

One of the other projects I've spent some time on is a preliminary mission design for a NASA Lewis Research Center project called Centaur Aerobraking Flight Experiment (CAFE). They are looking into using a dedicated Atlas/Centaur, perhaps in 1991, with a deployable aerobrake folded around the upper stage. The Centaur flies out to about 8000 miles in altitude, withholding some of its fuel, coasts along back toward the Earth, fires the engine again to make the orbit look like a lunar return, opens the aerobrake, and contacts the upper atmosphere at around 280,000 feet in altitude. It will make about three coasts and braking maneuvers, using as little hydrazine propellant as possible (the cryogenic fuel will have long since vaporized), to arrive finally in a "Space Station" circular orbit about 250 miles up. The intention of the experiment is in fact to test the aerobrake design and materials for eventual use with Orbital Transfer Vehicles returning from geosynchronous orbit, the Moon, and even Mars. I have since attended a meeting to consider our involvement with AFE, a similar program with most of the **other** NASA centers (that shows you how much more closely everyone in NASA is working together these days...). This one uses a heavily-instrumented propulsion system and aerobrake released from the Shuttle bay for one pass into the atmosphere and a rendezvous back with the Orbiter; this may happen in 1992 or thereabouts.

* * *

I rushed around to get a copy of my receipt so that I could have someone look at my Amiga 2000 under the three-month warranty, only to find that the only thing wrong with it was my plugging one of the video pins into the wrong jack (they changed the configuration in the rear significantly from the 1000). I feel a proper fool... Anyhow, all is up and working well, except the old graphic software I own. Commodore did indeed change the memory architecture somewhat, so that any of the commercial software written to use the fast memory in the 1000 doesn't work properly or at all on the new machine. Looks like I'll have to buy some **new** toys to play with when I don't feel like working...

* * *

I'm supposed to be going to Crystal City again in a couple weeks for the next meeting of the AIAA Technical Committee I'm on. It's being held during the AIAA Annual Meeting; I hope to wangle enough time to spend a weekend in Washington to visit the Mall, hit the GPO Bookstore, and get covered in cherry blossoms.

I'm taking the week after Memorial Day off to beat it out of here. My first stop will be a few days in Denver for the Space Development Conference. I'm curious to hear about something other than our own problems and to gaze upon the spectacle of the National Space Society clawing its own guts out (let's hope it doesn't come to that). I plan to meet up with Mr. Higgins there. After the holiday, I'll be going on to Chicago and down to Champaign to visit with as many folks as I can manage (it's been four (?) years since I've been there).

I'm not sure I'll be at any conventions this year. Much of the allure has worn thin for me. New Orleans is the only one I can think of where I'd see many people I know. However, the younger of my sisters is getting married on September 10th; as matters stand presently, I will not have enough vacation time to go back to New Jersey **and** to Worldcon. Consequently, I haven't made any arrangements at all for the convention. We'll see if things change by next month...

I hope to be hearing from you soon. Take care.

MAILING COMMENTS

APA-TECH 55

Cover There I was a couple hours before leaving for Phoenix, cooking covers over a makeshift alcohol stove out on my balcony. I suppose if I'd thought about it, I'd have realized that the Xerox toner would de-bond from the acetate. Looks like the whole idea was "flaky" in more ways than one...

Linda Your experience at the deer park in Nara reminded me of the same sort of situation we have at the "petting park" in the San Diego Zoo. The various ungulates there (sheep, goats, antelope, and the like) will attack any sort of flat protruding object, such as shirttails, Kleenex and handkerchiefs sticking out of pockets, etc. There are posted warnings to that effect around the enclosure. Food, in the form of something like rabbit pellets, is available for a nickel from dispensers rather like gumball machines (probably what they once were). We don't tend to give herbivores credit for much intelligence, but they all have learned to mob the machines the moment a human approaches one. As soon as you put a coin in and turn the lever, at least one of them will attempt to flip the lid up and stuff its snout up the chute.

Are you enjoying your Model 3 PC?

Joachim Congratulations upon attaining your "Advanced" license! Your discussion on atmospheric propagation and "skip" was a good one. I was already familiar with the physical theory, but they don't teach us in Electromagnetism class the art of how radio operators work a band or the techniques of gauging their operating range.

It's true that **Battleship Potemkin,** as indeed Russian cinema in general, is little seen in this country. Nonetheless, every real cinema buff here knows the "steps" sequence. The makers of **The Untouchables** do acknowledge, in **Premiere** magazine (and perhaps elsewhere), that their segment in the railroad station is an allusion to Eisenstein. It was also sort of thought up and shot on the fly, which may account for your feeling that it was rather unmotivated by the plot. Other people have "swiped" that sequence before. Woody Allen (a notorious European film fan) stages it in **Bananas,** on the steps of the presidential palace in the fictional land of San Marcos. In **Brazil,** Terry Gilliam also refers to it during a shootout in the lobby of the Information Services building (with a large institutional vacuum cleaner bouncing down the stairs). (Incidentally, the contemporary English painter Francis Bacon alludes to the image of the screaming woman in his **Studies (after Velasquez's Portrait of Pope Innocent X),** sometimes called the "screaming Pope" series.) The sequence is Eisenstein's contribution to this century's vocabulary of images.

I'd be interested in hearing more about what you have to say on teas. I've never thought much about brewing "methods." I tend to experiment and judge about how long a particular variety should steep. I drink less tea than I used to, though, because I am becoming hypersensitive to caffeine in my old age...

APA-TECH 56

Cover Did you have to get a "Class B Explosives" permit to mail this issue?

Susannah and sometimes Dave Ah, yes! Whatever happened to **Starwind,** anyhow? Every so often, magazines and newspapers like to run articles on people with "vocation-appropriate" surnames. **Science News** did one some years ago on scientists: my favorite example was a university course on "The Biological Decomposition of Wood," taught by the elderly Prof. Wood.

I'd read about the "Wizard of Ahs" award in a **New York Times** article some time back. To train members of the public speaking group to deliver their addresses more evenly, or at least avoid vocalizing during a pause, the monitor would drop a nail into a coffee can every time an "ah" emerged from the speaker's mouth. This noisy attention-getter seemed to have some success in disciplining members.

The **Times** had an article a ways back on Mr. Twinings, the English tea magnate (?). He referred to such products as Celestial Seasonings as "herbal infusions"; apparently, only certain kinds of plants can be considered as producing teas.

Joachim The passage of your electric typewriter through the fifth dimension sounds plausible to me. The fact that the diameter of the Universe is only 10^{-23} cm. there would explain the dents and abrasions.

My folks and I visited London for a few days back in July of 1972. I agree with your remarks about the weather: I've heard that 75°F. is considered "hot" there. Remember that this is **with** the Gulf Stream helping out, too. By rights, the British Isles should be tundra (well, I exaggerate slightly...).

I've seen some advertisement suggesting that the "Chunnel" would open around 1993. Has anyone here seen any definite statement? Your description of the mock Underground map reminded me of the subway, in Niven's **World Out of Time,** connecting South America with Antarctica.

Barry and Rod Perh[illegible] have come to feel by now that the new **Star Trek** seri[illegible] much less derivative. I've even found a couple of the scripts rather pleasing. [illegible] next big problem I feel they had for a long time was the lack of ensemble work in the stories: there were a few where I had no sense of the characters' working together at all. Things seem much improved of late and I have a better sense of **who** some of these people are. My favorite has to be the Captain, a wonderful curmudgeon with some interesting tastes and quirks; sometimes I get the feeling, with his love of old France, that he thinks he's *Le Roi Soleil* himself (who's dis guy Leroy Solay?). *"Le starship, c'est moi."*

APA-TECH 57

Cover Isn't that the way it is with these covers, that there's always some pieces missing? (Have you checked under the copy machine?)

Actually, I tend lately to think of high-energy physics as beating a confession out of Nature. "OK, spill it! What are the fundamental particles of the Universe? First you gave us that 'atom' jazz, then you said it was 'nucleons', then you gave us the runaround with all those stupid 'resonances', and **now** you're telling us it's 'quarks'. I want the **truth** this time -- **out** with it!! ... Oh, so you won't talk, eh? All right, we'll play it **your** way... Bring in the **big** magnets, boys..."

Susannah and Dave All this talk about microfilming thousands of blueprints reminds me of the docudrama on PBS a few years ago, **Mirage.** After the Six-Day War, Israel's air force was a lot more shot-up than they wanted anyone to know about. They desperately needed spare parts for their Mirages, but had no available engineering information on how to make them. They couldn't buy them from France, so they found another approach. West Germany was licensed to manufacture said parts. As it happened, the plant there was transferring all of their engineering drawings to microfilm. Israeli operatives managed to get to the engineering chief in charge of the transferral. Soon he was sending waste paper down the incinerator chute and driving cratesful of classified documents over the border into Switzerland for pickup on Saturdays at an associated factory. Obviously, he got caught (on one of the very last shipments) or we wouldn't have this re-enactment. An interesting story of industrial espionage and intrigue; maybe it'll be back on TV sometime...

Rolf Do cats obey Hooke's Law? It sounds like there's a linear restoring force drawing them out of the bathroom -- makes for challenging juggling...

Bill Now you want to go **sailing**? Haven't you wound up in a river enough times yet?

I seem to recall someone staging a double-decker bus race once somewhere out here in the Southwest. Racing construction equipment?! Why stop there -- how about Shuttle carriers? How about having one of those goofy trucking competitions: Shuttle carrier **vs.** "Bigfoot"? Shuttle carrier **vs.** Abrams M1?

I was thinking about your remarks about Japanese influence on American popular culture. They've made substantial inroads into our comics industry in the last year or so. I've seen *kanji* on T-shirts for some time now (or is that mostly a Californian phenomenon?). Will American children make an effort to pick up the language? (We have enough trouble getting them to learn English...) Will Japanese influence continue to strengthen in the Nineties? I have my doubts of late as to how much longer they can maintain their present economic status. The big problem is that most of the things that got them where they are now are starting to fail them (though they've helped to lift up a lot of Eastern Asia in the process). If the yen really does fall to 100 per dollar or lower, there could be a lot of agony.

Hmm... in regards to your cartoon, time was when getting a tan by standing in the English rain was sufficient... (ook-ook-a-choo!)

Gabe and Audrey Welcome to the APA! I hope it sticks around long enough for you enjoy it.

What branch of psychology are you interested in? Neurological? Pathological? Sociological? I found when I was looking for something to write about for one of my education courses that human creativity is a poorly explored field (or was around 1980). I don't have any solid ideas of a topic you could research and write up in eighteen months, though.

Valli The coverage of women's contributions to the arts and sciences is steadily improving (probably could still use some work). My art courses over the years did at least discuss painters and other artists such as Cassatt, Bonheur, Morisot, Hoch, Kollwitz, Oppenheim, Frankenthaler, Nevelson, etc., but none of them at great length. Contemporary female artists fare rather better in receiving attention, inasmuch as the general public pay attention to the art scene at all. I can see that denial of significant recognition can be a very effective way of discouraging women (or any other group of people) from entering a field of endeavor.

Sorry about the way your Morisot article came out. I wound up having to copy it **before** giving it to the copy shop, as they tend to get creative with my written instructions (as it was, they **still** loused up the pagination!). The copy looked great on our machine at work: ours must be better adjusted than the commercial one...

APA-TECH 58

Cover I looked at this drawing again right after seeing the **Nova** episode on superconductors and starting wondering what the current flow would be like in non-orientable superconductive ceramic pottery. Probably depends on which end you pour the liquid nitrogen into... (I must admit that the whole idea makes me feel a bit dizzy.)

GTB The whole situation is pretty depressing alright. This is perhaps the fourth time the APA has come close to death and it's always hard to judge whether the end has finally come. Let me put forth this proposal. If you are really fed up, I am willing to assume full editorial responsibility, since we have gone back to a bimonthly schedule. If things really don't improve by, say, year's end, I am prepared to kill this poor sick thing off once and for all. It has seemed to me for some years now that publications have been on the way out in GT and that the group exists only as a social organization (happily, it is at least that much). **Pyro** looks to be dead already unless someone else once again attempts to revive it (would it be worth the effort?). Maybe too many of us are just getting too old for this sort of thing. I certainly want to stay in touch with all of you, but I'm quite tired of hearing about activities being referred to as "GT projects", when so little of the "membership" (whatever that means) contribute to their success or even their continuance. I am quite ready to inter GT on December 31, 1988 and get on to other things. But **please** keep your letters and phone calls coming: I still want to hear from you folks.

Rod I'm thinking about picking up **Ogre** for my Amiga, since I've played that, **Rivets**, and **G.E.V.** some time ago. I'm not looking for many games, but I'd like to get a couple to replace the ones that don't run on the 2000.

* ahem * The military did not **reject** the Northrop flying wing; that's just what Washington wanted people to believe back in the Fifties. What came out near the end of Mr. Northrop's life was that then Defense Secretary Stewart Symington and Herbert Odlum, then owner of General Dynamics, had decided that GD was going to build the Flying Wing and that Northrop was going to turn it over to them. When Northrop refused, Symington decided that **no one** was going to build it. Military police showed up shortly thereafter and seized all the engineering drawings; a bit later, crews came out and cut up **all** of the existing Flying Wings (in case you wondered why you've never seen one in a museum). Ironically enough, after thirty-five years, Flying Wings will be making a comeback and Northrop will have the last laugh.

Sending "cargo ships" with supplies on ahead in manned Mars missions is certainly one possibility. Even with electric propulsion, though, all of the items not needed by the humans to make their journey would have to go out on the **previous** launch opportunity, which would leave the stuff sitting out there for a couple of years until the crew showed up to collect it. I'm not convinced that the scheme saves all that much ship's mass or travel time for the total mission; I'm planning to take that up as a consideration as I go back over my own work.

Annette Yes! You want someone like Sternhagen (I've forgotten her first name), who played the mining colony physician in **Outland**, as the Security Chief. Regrettably, this is one of those characters that I don't feel the writers have figured out what to do with (some weeks, they'll give her a whole **paragraph** to recite...). (You've probably noticed, by the way, that almost all of the major female characters are young and the one older woman they wanted to introduce as a continuing character -- the Councilor's mother -- is almost completely insufferable.)

This last was a better-than-usual teaching experience for me, since I was up before students of a chosen specialty, instead of chair-warmers looking to pick up a cheap "B". Grading would have been easier if I didn't have this penchant for inventing "cute" problems that I don't already know the answers to.

Barry Oh, so **that's** what all the noise was! (Planets blow up more quietly...) Nice drawing of Obi-Wan: looks like you've been drawing on the right side of your brain again. By the way, congrats on the PhuD!!

I hope you find the position (not merely geographical) at U. of Chicago to your liking. Some of Annette's and your comments, though, make me wonder if I'm so smart in wanting to go back for a doctorate. ("Help me, Mr. Wizard! I don't wanna be a post-doc anymore!!")

Mars Underground News

VOLUME I, NUMBER 4 FALL 1987

THE CASE FOR MARS III

Over 400 scientists, engineers, academicians, educators, policy-makers and other professionals attended the third Case for Mars conference held in Boulder, Colorado from July 18 to 22, 1987.

The program, entitled "Strategies for Exploration," offered some 200 presentations and 16 workshops on topics such as mission strategy, spacecraft design, advanced propulsion, space power systems, life support and biomedical factors, Mars base design, resource utilization, Mars rovers, and scientific goals.

The role of Mars and space exploration in public policy was emphasized to help raise the issue among government policy-makers and academics outside the space community. Therefore, in addition to covering technology advances, conference sessions were devoted to space policy, social impacts, economic issues, international cooperation and education. To complement the formal presentations, 16 workshops covered both technical and policy issues.

In this issue we begin a series of articles on the Case for Mars III conference. We will review the highlights, main themes and new concepts presented in Boulder. They represent a diversity of views and proposals all leading to a common objective: the human exploration of Mars.

PART 1: TRANSPORTATION SYSTEMS

One of the key conclusions is that the ability to launch massive cargos from Earth, reliably and inexpensively, is essential. At our current pace, in the 1990s we will only be able to put 100 metric tons per year into low Earth orbit (LEO). Since Mars missions would require 100 metric tons or more, this amount must be increased. Three current programs address this problem: the shuttle-derived heavy-lift launch vehicle, the Air Force's Advanced Launch System program, and the national commitment to scramjet technology (the aerospace plane).

Looking beyond current technology, the advanced propulsion workshop pointed out the tremendous leverage possible using advanced propulsion systems in future missions. This could reduce ship mass required in LEO or shorten the transit times between planets.

From the human perspective, we need advanced propulsion systems to cut down on travel time between Earth and Mars. A year is a long time to travel; less time will mean less risk to the human passengers from radiation, weightlessness and psychological effects. It would also lessen demand on life support equipment, would eliminate the need for artificial gravity, and allow smaller cargos of consumables. The working group felt that the benefits of reduced transit time and reduced ship mass warrant an intensified effort in advanced propulsion research. Also, aerobraking, a method of decreasing the speed of a vehicle by grazing the atmosphere of Mars or Earth, will have to be developed.

In the session on space power, laser-power transmission to support Mars airplane and space vehicle propulsion was proposed. Energy from nuclear or solar-power space stations could be beamed to spacecraft as well as to other work sites in space, on the Moon or on Mars. Beamed energy could become the chief means of power distribution in space as conversion efficiencies are improved.

Another popular transportation alternative to support sustained Mars habitation is the use of cycling interplanetary space stations in Earth-Mars periodic orbits. One or more stations would cycle continually between Earth and Mars. During flybys smaller taxi vehicles would meet the space station to transfer crews and supplies. Although the round-trip time for cycling space stations is a year or more, because they do not land the stations could be massive facilities while still needing only modest amounts of propellant to maintain course. Such systems are consistent with the use of a lunar-supported transportation node and propellant manufacturing plants on the Moon and on Mars.

Attendees recommended development of a dedicated space station designed for orbital assembly, docking and servicing of interplanetary spacecraft. The station would also be used for research, crew training, and as a quarantine facility for returned samples and crews. The station could be placed in any orbit, but it was suggested as an international facility, perhaps co-orbiting with the Soviet *Mir* space station or with the NASA/international space station.

Most participants felt that a "real" visit to the Red Planet was important and that a "sprint" mission, such as the *Apollo* mission, ought to be avoided unless it leads to a permanent outpost and research station.

We will continue our report on the Case for Mars III in the next issue.--*Tom Meyer and Paula Korn*

MARS SCAN

THE ONCE-WET LOOK: Arizona State University geologist Ronald Greeley reported in *Science* magazine that the amount of water released on Mars through volcanic activity may once equaled a layer over 150 feet deep. Another water source, may have been cometary impacts. Using data gathered by *Mariner 9* and *Viking*, Greeley suggests that the water covered Mars during the first billion years of its history. The greatest volumes of water may have swept across the terrain 3 to 4 billion years ago, perhaps leading to the creation of the large outflow channels. Why Mars switched from the wet look to its present condition remains conjecture.

TRAINING GROUND FOR MARS?: Support appears growing for creation of a simulated Mars base in Antarctica. The concept was backed by Doug Morrow of Broomfield, Colorado at the Case for Mars III conference. Morrow envisions a large-scale, multi-national Mars Base Prototype (MBP) in Antarctica, with the facility serving as a testing ground for a joint US/USSR, et al, expedition to and human base on Mars. "The design of such a base," stated Morrow, "could lead to the development of an international training program for future Mars base designers and inhabitants."

TANK TALK: The potential scientific use of the space shuttle's external tank (ET), if placed in Earth orbit, got a hard look last August during a Boulder, Colorado symposium. The program was convened to stimulate "blue sky" thinking and was sponsored, in part, by NASA, the Martin Marietta Aerospace Corporation and the Universities Space Research Association. Among the many candidate uses was one for closed-ecological

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life-support systems (CELSS). A space greenhouse within the immense innards of a tank was suggested during the symposium. "Use of an ET for planet research could be a fundamental step leading to knowledge and techniques for long-duration flights or habitation of lunar or planetary bases," stated the proceedings of the symposium. For more information, contact: Dr. Randolph Ware, President, External Tanks Corporation, 1866 Broadway, Suite 405, Boulder, CO 80302, (303)444-6221.

RADIO CONTROL: In early 1989, the Soviet robotic probes investigating Mars' moon Phobos will execute a set of delicate maneuvers under the control of the USSR's RT-70 radio telescope. The Crimea-situated radio antenna recently has been reequiped with a new-generation transmitter called "Goliaf." The 200-kilowatt transmitter will be necessary to guide the robotic probe with a precision of some 15 feet from millions of miles away back on Earth. The new equipment, as well as a new set of data-processing and command hardware, has been undergoing shake-down tests at the control complex.

PUTTING ON THE BRAKES: Gene Menees of NASA's Ames Research Center reported at the International Astronautical Federation meeting in October in Brighton, England that work is progressing on aeroassisted vehicle design studies for the Mars sample return mission. Menees reviewed the Ames work that uses state-of-the-art codes incorporating advanced real-gas thermo-chemical relaxation effects, useful in analyzing the impact of a 20 miles per second reentry to Earth of a capsule carrying a sample of martian rock and soil. In addition, an aerobrake design proposed for NASA's future Aeroassist Flight Experiment has been tasked to study the effects of Mars' atmospheric composition (95% CO_2, 4% N_2, 1% Ar) on heat-shield materials.

MICROGRAVITY MILESTONE: The Soviet Union continues to make headway on flight qualifying humans for interpla etary travel. In early October, Cosmonaut Yuri Romanenko aboard the *Mir* space station broke the world endurance record for protracted space flight: 237 days. Romanenko will be i orbit some 300 days by December 2, po sibly headed for a full year in orbit His one-year exposure to microgravity will help us to understand better any major medical maladies that could face Mars-bound explorers in the decades t come.

UPCOMING ACTIVITIES

A conference and a new book on Mars is being proposed by Hugh Kieffer of the US Geological Survey in Flagstaff, Arizona. Kieffer is organizing a committee to develop a review book on current scientific knowledge of Mars. The book would detail Red Planet research as of early 1989. Kieffer is also proposing a January 1989 conference in Tucson to follow the flurry of Mars robotic probe launches by the Soviet Union in late 1988. Those wishing to help in the organization should contact: Hugh Kieffer, Branch of Astrogeology, USGS, 2255 North Gemini Drive, Flagstaff, AZ 86001.

The 26th Aerospace Sciences meeting of the AIAA will be held January 11-14, 1988 in Reno. One session is titled "Scientific Investigations at Lunar and Martian Bases," chaired by W.W. Mendell of NASA's Johnson Space Center. B.M. Jakosky of the University of Colorado, Boulder will speak on current and past climate on Mars; C.P. McKay of NASA's Ames Research Center will discuss exobiology and future Mars missions; and B.C. Clark of Martin Marietta in Denver will speak on long range exploration by humans on Mars. For further information, contact: AIAA, 370 L'Enfant Promenade SW, Washington, DC 20024 (202)646-7471.

The annual meeting of the American Association for the Advancement of

Science (AAAS) is to be held in Boston, February 11-15, 1988. In a preliminary outline of the program, a session on international cooperation on large-scale space ventures will be held on Friday morning, February 12. It will include a discussion of human expeditions to Mars as well as lunar exploration and space policy. For details, contact: AAAS Meetings Office, 1333 H Street NW, Washington, DC 20005.

The 19th Lunar and Planetary Science Conference will take place March 14-18, 1988 at NASA's Johnson Space Center in Houston. Held under the auspices of the Lunar and Planetary Institute (LPI), sessions will include updates on past, present and future research on Mars. A call for abstracts has been issued by LPI, with a deadline for their receipt of January 20, 1988. Contact: LPI Publications Office, 3303 NASA Road 1, Houston, TX 77058, (713)486-2143.

Polar Processes on Mars is a workshop sponsored by NASA's Planetary Geology program and Ames Research Center. It is planned for sometime in May 1988 at a west coast site still to be determined. The purpose of the workshop is to assess current understanding of martian polar processes and what those processes tell us about the planet's climate. The workshop will also help define observational strategies for the *Mars Observer*, as well as scientific issues for a possible sample return mission. Contact: Robert Haberle, MS 245-3, NASA Ames Research Center, Moffett Field, CA 94035, (415)694-5491.

Mars Colony Art is wanted by the National Science Teachers Association (NSTA) as part of its Space Science Student Involvement Program (SSSIP) 1987-88. NSTA has created a Mars art contest for students in grades 7-12. Entries are to depict the first colony on Mars and must be submitted on art board or canvas board, no larger than 16" x 20". Any medium appropriate to two-dimensional work will be acceptable. The colony must accommodate 10 people, illustrate life support and transportation and be accompanied by an explanatory paragraph. Winning entries will be displayed nationally. Entries must be postmarked by March 15, 1988. Contact: SSIP, NSTA, 1742 Connecticut Ave. NW, Washington, DC 20009.

THE REFERENCE SHELF

Spacebridge Transcripts are available for "Together to Mars?" the July 18, 1987 satellite linkup between US and Soviet scientists, sponsored by The Planetary Society. Highlights of the event were broadcast on PBS October 7. For a transcript of the discussions, send $4.00 to: Spacebridge, KCET, 4401 Sunset Blvd, Los Angeles, CA 90027. For a transcript of the television show, send $4.00 to "Together to Mars?", PO Box 94056, Pasadena, CA 91109.

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ELECTRONIC ENGINEERING TIMES 12/28/87

Electrons And Conduction: Not So Simple After All

By Chappell Brown

The behavior of electrons in metals is something electronic engineers could take for granted—they thought. But experimental physicists have begun to doubt the recieved explanations, suggesting new theories of conduction and possibly technologies based on them.

The rallying point of revisionist electromagnetic theory is the nearly forgotten work of Andre-Marie Ampere. Eclipsed for a century and a half by the comprehensive equations of English physicist James Clerk Maxwell, Ampere's alternative formulation, based on a force law submitted to the French Academy of Sciences in 1820, has been rescued to explain experimental anomalies (see April 6, Page 49).

A recent seminar on electrodynamics at Northeastern University (Boston, Mass.) was convened to examine explanations for forces in conductors that modern theory does not predict.

Experiments with an electromagnetic-impulse pendulum conducted by Peter Graneau, director of the university's Center for Electromagnetics Research, and independently by P.T. Pappas, a Greek physicist, have revealed electromechanical forces that could not exist according to the relativistic Lorentz force law. And this is only one of a growing list of experiments that contradict modern electromagnetic theory.

It takes courage to propose Ampere's electrodynamics as the answer. He knew nothing of electrons or of the atomic structure of conductors. He was even unaware of electromagnetic induction, which was discovered later by Faraday in England. And Ampere hoped to do for electromagnetic forces what Newton had done for mass and gravity—formulate a simple force law that covered all possible cases.

All of this makes his theory appear to be a museum piece.

"We have to partially discount Ampere's theory," admits Graneau, "but within the limitations of his methods, he did a remarkably good job."

The Lorentz force law describes electrons moving through a conductor under the influence of an electrical field. "But when it comes to engineering, the moving-charge description is replaced by a current flowing in a segment of a conductor—the current element," Graneau says.

He is troubled, however. "The received explanation for conduction is so artificial as to be hardly believable."

Graneau organized a seminar on electromagnetic theory in the early '60s at the largest wire and cable manufacturer in the U.S.

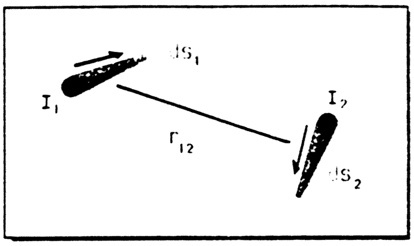
"Not one of their engineers could tell me what made electricity conduct in wires. I was astounded to find that a leading electromagnetics expert I had invited to speak admitted he didn't know."

Ampere's current element now appears as a reliable guide in an increasingly confusing situation.

(Continued on Page 22)

$$dF_{21} = -r\,\frac{I_1 I_2}{c^2 r_{12}^3}\left[2\,ds_1\cdot ds_2 - \frac{3}{r_{12}^2}(ds_1\cdot r_{12})(ds_2\cdot r_{12})\right]$$

AMPERE



$$dF_{21} = \frac{I_1 I_2}{c^2 r_{12}^3}\,ds_1(ds_2\cdot r_{12}) \quad r_{12}(ds_2\cdot ds_1)$$

LORENTZ

The Lorentz force law explanation of forces between wire carrying currents seems to be wrong. Ampere may be able to supply the right answer.

(Continued from Page 21)

The electron has been the irreducible element in 20th century physics. But participants in the Northeastern seminar proposed equations that re-interpret modern theory with the current element as the fundamental unit. Even the electron, unknown to Ampere, can be reduced to Amperian terms.

"Lorentz was trying to interpret new experiments with electrons moving in a vacuum. The theory was then applied to conductors as well," explains Pappas.

But Pappas has now shown that the Ampere and Lorentz laws only agree for closed circuits. When the source of the electromagnetic effect is an isolated current element, a large discrepancy appears.

Pappas has proposed a theory of conduction that replaces a density of charges moving according to the Lorentz force law with a density of current elements obeying Ampere's law.

This model predicts repulsive forces at the interface between two different metals. These forces can be observed when a copper conductor is placed in contact with mercury. Mercury jets emanate from the wire electrode when a current flows.

Amperean forces also explain the wire fragmentation that occurs at high currents. Current-element analysis also explains the existence of the longitudinal electromagnetic waves that were observed by radio pioneer Nikola Tesla. Because such waves cannot be derived from Maxwell's equations, Tesla's experiments were ignored, Pappas relates.

The key to tying Amperian current-element theory down to something concrete may turn out to be Ralph Sansbury's theory of dipole equivalence.

Sansbury became involved in Amperian theory in the mid 1970s when he noticed a mathematical similarity between electrostatic dipoles and Amperian current elements.

He suggests that the electron may not be the fundamental unit, positing instead a combination of positive and negative charges forming an electrostatic dipole with a net negative charge. If this is so, then the electron itself would act as Ampere's current element.

The model also would explain the increase in mass of an electron as it approaches the speed of light. Further, it is a way of generalizing Ampere's electrodynamics outside of the special situation of current-carrying wires. And the electron as electrostatic dipole gives some new interpretations to fundamental particle physics.

Dipole theory supplies an atomic explanation for the Amperian current element. Graneau had already had a hunch that the element had something to do with the ionic lattice of conductors.

Ampere assumed that both the electrical fluid and the material of the conductor were a continuous, infinitely divisible medium. In some situations, that leads to solutions that turn out to be infinite. Such solutions result from allowing the current element length to go to zero, which Ampere did to make use of differential and integral calculus.

Through finite element analysis software he has developed from Ampere's theory, Graneau has found that a small but finite current element will give answers that agree with experiment.

Sansbury's demonstration that Amperian current elements and electrostatic dipoles were equivalent stimulated some thoughts on what an atomic-sized current element might be.

"If we assume that the conduction electron does not completely detach itself from the donor atom, but remains loosely associated with it, then the positive ion with the electron at a greater distance than normal would create a dipole," Graneau says.

The effect of an electromotive force applied to a conductor would then be to push the electron away from the nucleus to produce directed current elements throughout a conductor.

The dipole model does away with the idea of fluids or the transport of charges. "Conduction" now means a particular kind of electrical excitement in a metal in response to the applications of an EMF.

Though still in its formative stages, the model has some exciting possibilities. The dipole analysis, when applied to hydrogen atoms in free space, explains valence bonding, the most common type of chemical bond.

The theory also explains diamagnetism and the Meissner effect found in superconductors. And the most promising explanation of high-temperature superconductors is based on resonating valence bonds, Graneau points out.

Not all of the seminar participants were enraptured with Ampere and forces acting at a distance. Cynthia Whitney, a field theory expert with W.J. Shafer Inc. (Chelmsford, Mass.) suggested a conduction model that uses electrons as carriers but eliminates the field that is supposed to make them move through the lattice. The model assumes that the electrons are carried along by kinetic energy that they acquire while in the source of the EMF.

The idea arose from an examination of a list of experiments that show violations of normal Lorentz-Maxwell electromagnetic theory. Without appealing to antique physical theories, Whitney believes a small modification of the electron carrier model can account for the anamolies.

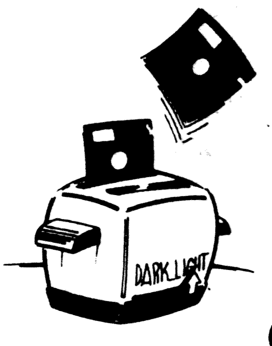
She is critical of the Ampere electrodynamics model because it does not do a much better job of accounting for the impulse-pendulum experiment. "It occurred to me that the normal assumptions about a constant current flow, that carrier density and velocity are constants, might be too strong. Both could vary in such a way that the current remains constant." By assuming that electrons move through the metal lattice only under their own kinetic energy, she found a consistent model of conduction. It gives a better account of the impulse-pendulum experiment and also explains a host of other results.

One of these experiments was performed at the University of Utah. Researchers there have conclusively measured an electrostatic field produced by a current in a superconducting coil. This measurement contradicts a principle of electromagnetics that has stood since 1850 when it was enunciated by Clausius. Possibly, Whitney's modern variation on conduction theory may explain this curiosity.

Nuts!!

Now I have to take E&M over again!

for all you GT old-timers = Cosmo Klein lives!!



the lighter side of computing

from Computer Edge, 2/19/88

Gigantor: Computer from Hell

By Dan Gookin

This doesn't happen as much as it used to. But once the computer world was rife with these frenetic fanatics. I'm speaking of none other than the microcomputer over-enthusiast. Just be glad these guys fell into computers. I shudder to think of them getting into gardening hobbies. Imagine a lawn mower that doubles as a vacuum cleaner.

Back in the ancient days of computing, oh, say 1980 to 1982, people into computers were mostly hobbyists. They called themselves "hackers" because they loved to tinker. You are called a "scientist" when you tinker professionally.

By the way, hobbyist computing ended around 1982. This was due to the IBM PC. Because IBM "legitimized" the microcomputer market, people in the Real World felt that computers should have practical applications. This, of course, was the exact reverse of your typical microcomputer over-enthusiast.

I met a true, diehard microcomputer over-enthusiast just the other day. I'll call him Moe, because microcomputer over-enthusiast (m.o.) looks awkward when over-hyphenated.

Moe claimed to have been around since the early days of computing. But I think he really started in 1982. That was the year his beloved Timex computer came out. Now, Moe admits that the Timex was never much of a computer. That's why he's tinkered the tiny little thing to death. In fact, if you saw Moe's Timex today—without any forewarning—you'd probably run away screaming, or at least wet your pants.

"It started when I couldn't use the Timex's stupid little keyboard. I have these really fat fingers," Moe explained, showing me a stout thumb. "And the 'RAM Pak' kept falling out of the expansion slot. So, I thought, 'I should fix it up right.'"

Moe proceeded to put a new keyboard on his Timex, plus a sturdy back plating for the RAM Pak. After a time, he sat back and looked at his creation. "It needed more," he said. So, Moe completed what he now calls Phase One of his machine's transformation. The Timex was mounted in an old portable TV cabinet.

Phase Two came along quickly after Phase One's completion. Moe's wife refers to Phase Two as the "Dark Ages" because she didn't see or hear from Moe for three solid weeks. When he did finally emerge, the tiny Timex computer in the portable TV cabinet was now mounted on legs with casters. Little pulleys controlled the wheels on the legs and the computer rolled around using the battery from Moe's Oldsmobile. "I wondered why the car didn't

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start," Moe's wife told me.

"It was nice having the computer on wheels," Moe explains. "It was getting too heavy for me to tote to the users group meeting." The sad part, Moe discovered, was that his Timex needed to be programmed with a destination. And unless told precisely what distance to move and when to turn left or right, the computer usually ran into a wall or knocked over furniture.

"It was heavy," Moe's wife recalls. "I shuddered when I saw it coming down the hall. I didn't know if it would stop, or turn, or what. When it knocked over grandfather's ashes that was the last straw."

Soon Moe programmed the Timex with a layout of the house. Then, in what he calls Phase Three, he put audio and visual receptors on his Timex. Now the computer could see where it was going, or what it was about to bump into. Also, Moe could call out the computer's name and the audio receptors would attempt to locate him in the house.

The computer's name? Gigantor—after the famous movie monster. The Timex was now getting quite big. Not only was it a computer inside a portable TV box with metallic rolly legs, it also was equipped with two large salad bowl-like audio receptors and three electronic eyes.

> ***"Moe wanted to impress his friends by saying, 'Gigantor, fetch me a beer.' The computer/robot would return moments later with a cold, uncrushed beverage."***

Phase Four of Gigantor's transformation from Timex home computer to terrifying monstrosity involved attaching arms to the portable TV box. Moe wanted especially to impress his friends by saying, "Gigantor, fetch me a beer," and have the computer/robot return moments later with a single cold, uncrushed beverage in its mechanical claw-hand.

Lately, however, Moe's wife has been worrying. "I don't think he's into this for tinkering anymore. In fact, Gigantor's battery has run down and I can't move him out of the bathroom. Poor Moe. He's been in the garage for ten days now."

Nothing is wrong with tinkering. In fact, even in today's world full of complete business computer systems—rather than the piecemeal spare parts hobbyists like Moe first dealt with—there's a place for experimentation.

I don't know what Moe is currently working on in his garage. Occasionally I see him dash off to Radio Shack, or to the military surplus store. All I can tell you is that whatever the contraption winds up as, somewhere deep inside, under layers of mechanical putter and servo motors, there's a *Macintosh*. And lord help me if that thing ever gets loose on this columnist. ☐